

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

TABLE OF CONTENTS

	<u>Page</u>
<u>1. REAL PARTY IN INTEREST</u>	2
<u>2. RELATED APPEALS AND INTERFERENCES</u>	3
<u>3. STATUS OF THE CLAIMS</u>	4
<u>4. STATUS OF AMENDMENTS</u>	5
<u>5. SUMMARY OF CLAIMED SUBJECT MATTER</u>	6
<u>6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL</u>	8
<u>7. ARGUMENT</u>	9
<u>8. CLAIMS APPENDIX</u>	13
<u>9. EVIDENCE APPENDIX</u>	17
<u>10. RELATED PROCEEDINGS APPENDIX</u>	18

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Karthik Ramani et al. Examiner: Dung K. Chau

Serial No.: 10/763,741 Group Art Unit: 2169

Filed: January 23, 2004 Docket: 1165.021US1

For: METHODS, SYSTEMS, AND DATA STRUCTURES FOR PERFORMING
SEARCHES ON THREE DIMENSIONAL OBJECTS

APPEAL BRIEF UNDER 37 CFR § 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Appeal Brief is presented in support of the Notice of Appeal to the Board of Patent Appeals and Interferences, filed on May 21, 2009, from the Final Rejection of claims 1-13 and 75-81 of the above-identified application, as set forth in the Final Office Action mailed on January 22, 2009.

The Commissioner of Patents and Trademarks is hereby authorized to charge Deposit Account No. 19-0743 in the amount of \$270.00 which represents the requisite fee set forth in 37 C.F.R. § 41.20(b)(2). The Appellants respectfully request consideration and reversal of the Examiner's rejections of pending claims.

I. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee,
PURDUE RESEARCH FOUNDATION.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

The present application was filed on January 25, 2004 as a Non-Provisional claiming priority to Provisional Application No. 60/442,373 filed on January 25, 2003. The application was filed with 74 claims. A Preliminary Amendment was filed to claims 1 and 7 on October 10, 2007. A Restriction Requirement was mailed on March 31, 2008. Applicant elected claims 1-13 for prosecution can cancelled, without prejudice claims 14-74. A Non-Final Rejection was mailed on August 1, 2008. A Non-Final Response added new claims 75-81. A Final rejection was mailed on January 22, 2009. Applicant filed a Notice of Appeal on May 21, 2009. Claims 1-13 and 75-81 are presently pending in this application; claims 1-13 stand finally rejected twice and claims 75-81 stand finally rejected once.

4. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action dated January 22, 2009.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Aspects of the present inventive subject matter include, but are not limited to methods, systems, and data structures for performing searches on three-dimensional objects.

INDEPENDENT CLAIM 1

1. A method for searching, comprising:
 - receiving a three dimensional object; [FIG. 1; page 14 lines 20-24; page 15 line 5 to page 16 line 8]
 - searching one or more data stores with the three dimensional object as a first search query; [FIGS. 49-50; page 56 lines 3-30; and page 57 line 1 to page 58 line 26]
 - presenting results from the search, wherein the results include an answer set; [FIGS. 56-58; page 14 lines 1-4; page 60 line 14 to page 61 line 3]
 - dynamically receiving modifications for one or more items in the answer set; and [FIG. 59; page 61 line 4 to page 62 line 14; page 8 lines 9-18]
 - re-searching the one or more data stores with the modifications associated with the one or more items as a second search query. [FIGS. 62-63; page 64 lines 1-31]

INDEPENDENT CLAIM 8

8. A method of searching, comprising:
 - receiving a two dimensional object; [Page 14 lines 21-25; page 19 lines 20-21; page 25 lines 8-11; page 35 line 16 to page 37 line 4]
 - mapping the two dimensional object to a three dimensional representation; [Page 35 line 16 to page 37 line 4]
 - searching one or more data stores with the three dimensional representation as a first search query; and [FIGS. 49-50; page 56 lines 3-30; and page 57 line 1 to page 58 line 26]

presenting one or more items in an answer set that is responsive to the first search query of the one or more data stores. **[FIGS. 56-58; page 14 lines 1-4; page 60 line 14 to page 61 line 3]**

INDEPENDENT CLAIM 77

77. A method for searching, comprising:

receiving a three dimensional object; **[FIG. 1; page 14 lines 20-24; page 15 line 5 to page 16 line 8]**

converting the three dimensional object into a skeletal graph; **[Page 35 line 16 to page 37 line 4]**

searching one or more data stores for graphs that are similar to the skeletal graph; **[FIGS. 49-50; page 56 lines 3-30; and page 57 line 1 to page 58 line 26]**

presenting results from searching, wherein the results include an answer set; **[FIGS. 56-58; page 14 lines 1-4; page 60 line 14 to page 61 line 3]**

dynamically receiving modifications for one or more items in the answer set; and **[FIG. 59; page 61 line 4 to page 62 line 14; page 8 lines 9-18]**

re-searching the one or more data stores with the modifications associated with the one or more items as a search query. **[FIGS. 62-63; page 64 lines 1-31]**

This summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to each of the appended claims and its legal equivalents for a complete statement of the invention.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-2, 4-7, and 76-77 were rejected under 35 USC § 102(b) as being anticipated by Gever *et al.* (U.S. Patent No. 6,329,994 – hereinafter “Gever”).

Claims 8-13 were rejected under 35 USC § 103(a) as being unpatentable over Gever in view of Shoov *et al.* (U.S. Publication No. 2003/0071810 – hereinafter “Shoov”).

7. ARGUMENT

A) The Applicable Law under 35 U.S.C. §102(b)

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. M.P.E.P § 2131. To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter. *PPG Industries, Inc. V. Guardian Industries Corp.*, 75 F.3d 1558, 37 USPQ 2d 1618 (Fed. Cir. 1996). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

B) Discussion of the rejection of claims 1-2, 4-7, and 76-77 were rejected under 35 USC § 102(b) as being anticipated by Gever.

Claims 1-2, 4-7, and 76-77 were rejected under 35 USC § 102(b) as being anticipated by Gever. This rejection is respectfully traversed, Appellant respectfully submits that the Final Office Action has made an improper prima facie showing of anticipation at least because Gever fails to teach or suggest: “searching one or more data stores with [a] three dimensional object” and fails to teach or suggest: “searching one or more data stores for graphs that are similar to [a] skeletal graph.”

Specifically, the Examiner maintains that the language of “searching one or more data stores with the three dimensional object” is taught or suggested in the Gever reference. Although, the Examiner admits in the Advisory action that Gever searches a three dimensional database by matching keywords associated with an image to indexed keywords associated with three dimensional objects in the Gever database. It appears the Examiner’s position is that the claim element recited above and the element for “searching one or more data stores for graphs that are similar to the skeletal graph” is read upon by the keyword mapping and matching process described in Gever.

Applicant respectfully disagrees with the conclusion of the Examiner. In Gever, an image (two dimensions) is used as search terms or keywords (one dimension) are used as search terms to search a animation database (three dimensional objects). The animation library of images in Gever is indexed with search terms (one dimension). The process in Gever is straightforward and uses a conventional approach where images are associated with predefined keywords and keywords are used as search terms against the animation library. This is not searching that occurs with a three dimensional search term and is not searching via a skeletal graph as a search term as is required in via independent claims 1 and 77.

It appears to the Applicant that the Examiner believes because Gever searches against a three dimensional animation library that Gever has to necessarily perform that searching via a three dimensional search term or skeletal graph. However, this is simply not what occurs in Gever and Gever completely lacks the necessary detail for using a three dimensional object or skeletal graph as a search term for a data store query. Keywords are insufficient for searching in three dimensions.

Gever merely maps text words to images and animation objects via a predefined indexing scheme. One of ordinary skill in the art would not understand how to perform a search of the animation library using anything other than keywords after reading Gever. One would not even begin to understand or believe that Gever permitted three dimensional objects or skeletal graphs to be used as search terms against a three dimensional data store.

Therefore, Applicant respectfully asserts that the Examiner's conclusions are misplaced and deficient. Accordingly, Applicant respectfully requests that the Board remove the rejections of independent claims 1 and 77 and their corresponding dependent claims and allow these claims.

C) The Applicable Law under 35 U.S.C. §103(a)

To sustain a rejection under 35 U.S.C. 103, references must be cited that teach or suggest all the claim elements. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991)). In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been

obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983); *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985); MPEP § 2141.02.

Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Appellant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991); MPEP § 2143. The Examiner must avoid hindsight. *In re Bond*, 910 F.2d 831, 834, 15 USPQ 2d 1566, 1568 (Fed. Cir. 1990).

D) Discussion of the rejection of claims 8-13 were rejected under 35 USC § 103(a) as being unpatentable over Gever in view of Shoov.

Claims 8-13 were rejected under 35 USC § 103(a) as being unpatentable over Gever in view of Shoov. This rejection is respectfully traversed, Appellant respectfully submits that the Final Office Action has made an improper prima facie showing of obviousness at least because the proposed combination fails to teach or suggest: "searching one or more data stores with [a] three dimensional representation."

For this rejection, the Examiner has combined Shoov with Gever. As discussed above in detail Gever lacks any teaching or suggestion of a teaching that would even remotely permit "searching one or more data stores with the three dimensional representation." The added Shoov reference also completely fails to teach or suggest this missing element from Gever. Shoov simply takes a two dimensional model and creates a three dimensional model. Shoov does not permit a three dimensional search term to perform searching against a data store.

Consequently, the proposed combination fails to teach each and every element of the rejected claims 8-13. Therefore, Applicant respectfully requests that the Board overturn the Examiner and allow claims 8-13.

SUMMARY

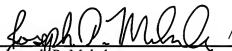
It is respectfully submitted that the art cited does not render the claims anticipated and/or obvious and that the claims are patentable over the cited art. Reversal of the rejection and allowance of the pending claims are respectfully requested.

Respectfully submitted,

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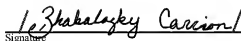


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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 21 day of July 2009.

Zhakalazky M. Carrion

Name


Signature

8. CLAIMS APPENDIX

1. A method for searching, comprising:
receiving a three dimensional object;
searching one or more data stores with the three dimensional object as a first search query;
presenting results from the search, wherein the results include an answer set;
dynamically receiving modifications for one or more items in the answer set; and
re-searching the one or more data stores with the modifications associated with the one or more items as a second search query.
2. The method of claim 1 further comprising, converting the three dimensional object into a graph skeleton defining a graph data structure, wherein the graph data structure is the first search query.
3. The method of claim 1 wherein receiving the three dimensional object further includes interactively permitting the three dimensional object to be sketched.
4. The method of claim 1 wherein the receiving the three dimensional object further includes presenting a list of three dimensional models and permitting the three dimensional object to be formed from selective ones of the list of three dimensional models.
5. The method of claim 1 wherein the presenting the results further include grouping selective portions of the one or more items in the answer set into related clusters.
6. The method of claim 1 further comprising, receiving one or more filters which constrain the first or second search queries.

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7. The method of claim 1 wherein the re-searching further includes identifying in the modifications for the one or more items information that identifies selective ones of the items that are more relevant to the first search query than selective other ones of the items.
8. A method of searching, comprising:
receiving a two dimensional object;
mapping the two dimensional object to a three dimensional representation;
searching one or more data stores with the three dimensional representation as a first search query; and
presenting one or more items in an answer set that is responsive to the first search query of the one or more data stores.
9. The method of claim 8 wherein the mapping further includes:
representing the two dimensional object as a two dimensional skeleton;
converting the two dimensional skeleton into a three dimensional skeleton; and
representing the three dimensional skeleton as a three dimensional graph structure,
wherein the three dimensional graph structure is used as the first search query.
10. The method of claim 8 further comprising:
receiving relevance indications for a selective number of the one or more items in the answer set; and
searching the one or more data stores with the selective number of the one or more items and the relevance indications as a second search query.
11. The method of claim 10 retaining the relevance indications as preferences for subsequent search queries received and processed, where the retained relevance indications are used as filters to subsequent first queries.

12. The method of claim 8 further comprising organizing the answer set as a plurality of related clusters, wherein each related cluster includes a selective number of the one or more items.
13. The method of claim 8 wherein the mapping further includes:
- converting the two dimensional object into a two dimensional skeleton;
 - generating candidate three dimensional vertices for each of two dimensions of the two dimensional skeleton;
 - generating candidate three dimensional edges from the candidate three dimensional vertices;
 - creating candidate three dimensional faces from the three dimensional edges on a same surface;
 - creating one or more three dimensional objects from the candidate three dimensional faces; and
 - associating the one or more three dimensional objects with the received two dimensional object as the three dimensional skeleton.
- 14.-74. (Canceled)
75. The method of claim 5 further comprising, selecting a cluster to allow further browsing within that selected cluster.
76. The method of claim 6, wherein one said filter comprises a total volume filter.
77. A method for searching, comprising:
- receiving a three dimensional object;
 - converting the three dimensional object into a skeletal graph;
 - searching one or more data stores for graphs that are similar to the skeletal graph;
 - presenting results from searching, wherein the results include an answer set;
 - dynamically receiving modifications for one or more items in the answer set; and

re-searching the one or more data stores with the modifications associated with the one or more items as a search query.

78. The method of claim 77, wherein searching further includes:

using a high-level graph matcher to determine whether graphs in the one or more data stores satisfy criteria; and

using a low-level graph matcher to evaluate similarity between the skeletal graph and the graphs in the one or more data stores that satisfy the criteria.

79. The method of claim 78, wherein the criteria include topology criteria and geometric properties.

80. The method of claim 79, wherein the geometric properties comprise at least one of:

edge type;

curvature information for surface loops;

a parametric equation of a curve;

local volume of features that converge;

local moments of the features that converge; and

local distances from a surface.

81. The method of claim 78, wherein the low-level graph matcher compares geometric feature attributes of the skeletal graph and of the graphs in the one or more data stores that satisfy the criteria.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.